EPA Region 7 TMDL Review

TMDL ID:	KS-LA-12-533-11	**Waterbody ID:**	
Waterbody Name:	TURKEY CREEK -- CHLORIDE		
Tributary:	SEE (ENCLOSURE A) FOR TRIBUTARIES COVERED UNDER THIS TMDL		
Pollutant:	CHLORIDE		
State:	KS	**HUC:**	11030012
BASIN:			
Submittal Date:	6/30/2006		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated June 30, 2006, and received by EPA on June 30, 2006, formally submitted this TMDL for approval under Section 303(d).

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Over the period of record, chloride concentration averages were established for KDHE ambient stream monitoring stations 246 and 533. In addition, data obtained from the City of McPherson, as required by their NPDES permit, was also utilized from a sampling location on Dry Turkey Creek below the confluence with Bull Creek. Data from station 246 was primarily utilized for comparison purposes only in this document, as this station is located along the Little Arkansas River below the confluence with Turkey Creek (See upper Little Arkansas River Chloride TMDL). The chloride averages for the sampling stations are illustrated in Table 1. Each site had a number of samples that exceeded the established water quality standards. Chloride exceedances over 250mg/L cease once flows reach the 15% exceedance levels at station 533.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The Kansas chloride criteria for domestic Water Supply is 250 mg/L at any point of domestic water supply diversion (K.A.R.28-16-28e(c)(3)(A)). For aquatic life support [acute criterion] is 860 mg/l for (KAR 28-16-28e(c)(2)(D)(ii)).

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The desired endpoint of this TMDL is to protect the domestic water supply by maintaining an average chloride concentration below 250 mg/L in Turkey Creek. The existing criterion is not achievable on Turkey Creek within the short term because it will take several decades for the historic brine pollution to dilute out. The flushing and recharge of groundwater are slowly diluting the saline waters produced from the historical practice of discarding brine pollution on the surface.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Natural chloride in the Turkey Creek watershed enters the streams from perched groundwater flowing through soils and shallow sediments above less permeable sediments. Another source of natural chloride is derived from groundwater discharge from the Equus Beds deposits of the High Plains aquifer. There are twelve permitted waste treatment facilities located upstream of station 533, all of which are in McPherson County. The permitted facilities are categorized as follows: three "non-overflowing" ponds or lagoons that are prohibited from discharging, five industrial permitted facilities, one commercial facility, and two municipal facilities. There are a few old oil fields in the Turkey Creek watershed along Running Turkey Creek and the main segments of Turkey Creek (see Figure 8). The majority of the oil-brine pollution originated from the Ritz-Canton Field in the drainage area of the upper portions of Running Turkey Creek and Turkey Creek. The effects of oil-field brine contamination in the Turkey Creek watershed were also documented in the KGS Salt Assessment study in the watershed.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The majority of the current impairment is associated with chloride loads that originated from NCRA, the City of McPherson and historic oil-field brine pollution.

WLA Comment

The City of McPherson is expected to complete WWTP upgrades within the next few years. At this time it is assumed the design flow will be approximately 2.4 MGD. Until the upgrades are completed, the wasteload allocation will be assigned to the City of McPherson based on a maximum discharge of 2.0 MGD and an average chloride concentration of 400 mg/L. By the year 2025, the wasteload allocation for the City of McPherson will be based on an average chloride concentration of 300 mg/L for their 2.4 MGD of discharge. Since NCRA has ceased discharging, the data from Dry Turkey Creek suggests that the chloride concentrations have even become more stable at a lower magnitude. The primary reason is that the City of McPherson discharge accounts for the majority of the flow to Dry Turkey Creek under low to normal stream flow conditions, after NCRA ceased discharging to Bull Creek.

LA Comment

Since brine will eventually dilute out over time, a load allocation was estimated under this TMDL based on the brine concentration diluting at a rate of 1% per year. The milestone for this TMDL has been set for the year 2025. By this time the chloride concentration attributed to brine should be reduced by approximately 21% and the City of McPherson should have improved source reduction practices to achieve an effluent chloride concentration average of 300 mg/L.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The Margin of Safety is implicitly established by conservatively assuming the entire chloride load reaches sampling station 533 under low flow conditions, when in fact the flow does not based on available USGS flow data.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation has been incorporated in this TMDL through the documentation of the seasonal consistency of elevated chloride levels.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings to discuss TMDLs in the Lower Arkansas Basin were held on June 7, 2006 in Hutchinson. An active Internet Web site was established at http://www.kdhe.state.ks.us/tmdl/ to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas Basin. Public Hearings on the TMDLs of the Lower Arkansas Basin was held on June 7, 2006 in Hutchinson. The Lower Arkansas Advisory Committee met to discuss the TMDLs in the basin on June 7, 2006.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will continue to collect samples from the rotation station (533) along Turkey Creek. Based on that sampling, the priority status will be evaluated in 2011 and thereafter, including application of numeric criterion based on background concentrations. Quarterly monitoring of chloride levels in the effluent discharge will be a condition of the NPDES and state permits for facilities above station 533 that actually discharge to the watershed.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

Even zeroing out the WLA would not lead to compliance with the existing water quality standards because of the brine fields and natural background concentrations of chloride. This is a phased following an adaptive management approach. The TMDL has established aggressive WLAs for the permitted facilities and recognizes the need for optional solutions to the problem because of the unknown changes from the brine field discharges.